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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference L3799-01	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US04/05659	International filing date (day/month/year) 26 February 2004 (26.02.2004)	Priority date (day/month/year) 05 March 2003 (05.03.2003)
International Patent Classification (IPC) or national classification and IPC IPC(7): C08L 83/04 and US Cl.: 525/100, 191; 524/284		
Applicant W.R. GRACE & CO. CONN.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

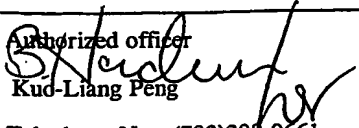
2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 21 September 2004 (21.09.2004)	Date of completion of this report 12 January 2005 (12.01.2005)
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer  Kuo-Liang Peng Telephone No. (703)308-0661

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US04/05659

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed.
- ☒ the description:
 pages 1-2, 4-6 as originally filed
 pages _____, filed with the demand
 pages 3 and 7, filed with the letter of 18 November 2004.
- ☒ the claims:
 pages NONE, as originally filed
 pages _____, as amended (together with any statement) under Article 19
 pages NONE, filed with the demand
 pages 8-10, filed with the letter of 18 November 2004 (18.11.2004)
- ☐ the drawings:
 pages NONE, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____.
- ☐ the sequence listing part of the description:
 pages NONE, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____.

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims <u>1-20</u>	YES
	Claims <u>NONE</u>	NO
Inventive Step (IS)	Claims <u>1-20</u>	YES
	Claims <u>NONE</u>	NO
Industrial Applicability (IA)	Claims <u>1-20</u>	YES
	Claims <u>NONE</u>	NO

2. CITATIONS AND EXPLANATIONS

Claims 1-20 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the use of a combination of saturated amide and an oxidized polyethylene and/or the specific thermoplastic polymers claimed in the present invention.

Claims 1-20 meet the criteria set out in PCT Article 33(4), and thus having industrial applicability because the subject matter claimed can be made or used in industry.

----- NEW CITATIONS -----

Detailed Description of Exemplary Embodiments.

As summarized above, exemplary compositions comprise a matrix polymer having essentially no erucamide or unsaturated amide; a silicone lubricant; and slip aid having a saturated amide, oxidized polyethylene, or mixture thereof.

The matrix polymer, copolymer, or blend thereof may be selected from those conventionally known for use in making containers, container closures, or closure sealants. For example, these include thermoplastic polymers such as polyethylene or ethylene copolymer with other lower alkenes, polypropylene, thermoplastic rubbers, ethylene propylene copolymers, acid modified ethylene propylene copolymers, styrene butadiene rubber, carboxylated styrene butadiene block copolymer, polyisoprene, styrene isoprene styrene block copolymers, styrene butadiene styrene block copolymers, styrene ethylene butylene styrene block copolymers, polystyrene block polyethylene/propylene copolymers, polystyrene block polyethylene propylene polystyrene copolymers, polystyrene block polyethylene ethylene propylene styrene copolymers polystyrene, ethylene vinyl acetate copolymers and terpolymers, ethylene acrylate co and terpolymers ethylene vinyl alcohol copolymers, butyl rubber, ethylene acid copolymers, and polyvinyl chloride polymers.

Compositions of the invention should be essentially free of erucamide and which is essentially free of unsaturated amide. In other words, amides contained in the composition should have an iodine value no greater than 10 and more preferably no greater than 5. The iodine value is a measure of the unsaturation of alkyl groups and can be measured using the Wjis procedure, such as ASTM D2075-92, among others.

Typical examples for closure liners are described in, for instance, US 5104710, EP 0478109, EP 0599356, EP 0488491, and 0646158. The liners may be applied to the closure in any of the known methods, such as those described in, for example, US 4518336, EP 207385, and US 4277431.

Typical examples for closures are described in, for example, US 5045594, US 5186991, US 6399170, WO 0162837, EP 73334, and US 4462502.

The addition of silicones to container closure and closure sealant compositions are not new, and examples of can be found in EP 129309. However, they are used in conjunction with an unsaturated amide(s) to provide the ability to lessen removal torque.

Example 2

In accordance with the procedure described above for Example 1, the following compositions were applied to caps and tested, as shown in Table 2 below.

Table 2

	A	B	C
EVA	90	90	90
EP	10	10	10
AO	.1	.1	.1
BLUE	.8	.8	.8
SI3	3	3	0
SI2	0	0	1.5
SR	0	1	1
OSP	1.5	0	.5
REMOVAL	13.6	10.3	12.0
TORQUE, IN-LB.			
STRINGING/ SCUFFING	0 %	0 %	14 %

This data indicates that by utilizing a mixture of siloxanes and ethylenically saturated amides and/or oxidized polyethylene, in combination, provided performance equal to that of erucamide.

Example 3

In another example, compositions similar to above were extrusion blended and pelletized. The pellets were then melted in another extruder, and the molten pellets were transferred directly from the extruder to the individual cap and immediately compression-molded.

The resulting lined caps were allowed to age at room temperature for a minimum of 1 week prior to testing. The caps were then applied to 20 oz. PET bottles filled with water using a commercial application machine. The bottles were stored at 40°F for less than week and more than 24 hours. After this period, tests were performed to measure the force required to remove the cap, and any tearing, scuffing or stringing of the liner was noted.

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1. A composition, comprising:

(A) a matrix polymer, copolymer, or blend thereof, which is essentially free of erucamide, which is essentially free of unsaturated amide, and which is operative to provide a container, container closure, or closure sealant, said matrix polymer, copolymer, or mixture thereof being selected from thermoplastic polymers consisting of polyethylene or ethylene copolymer with other lower alkenes, polypropylene, thermoplastic rubber, poly (ethylene propylene) copolymer, acid modified ethylene propylene copolymer, styrene butadiene rubber, carboxylated styrene butadiene block copolymer, polyisoprene, styrene isoprene styrene block copolymer, styrene butadiene styrene block copolymer, styrene ethylene butylene styrene block copolymer, polystyrene block polyethylene/propylene copolymer, ethylene vinyl acetate copolymer or terpolymer, ethylene acrylate copolymer or terpolymer, ethylene vinyl alcohol copolymer, butyl rubber, and poly(vinyl chloride) polymer;

(B) a lubricant comprising an organopolysiloxane, said organopolysiloxane having an average molecular weight not less than 40,000, said organosiloxane being present in said composition in an amount not less than .01 parts and not greater than 10 parts based on 100 parts of said matrix polymer, copolymer, or blend thereof which comprises said component (A), and said organopolysiloxane having a viscosity of at least 50,000 cst; and

(C) a slip aid comprising a saturated amide and an oxidized polyethylene, said slip aid being present in said composition in an amount not less than 0.01 parts and not greater than 8 parts based on 100 parts of said component (A), said amide having an iodine value no greater than 5 in accordance with ASTM D2075-92;

said composition when employed in a container, container closure, or closure sealant providing reduced off-tastes while maintaining slip-aid efficiency when compared to compositions containing unsaturated amide.

2. The composition of claim 1 comprising at least two of said thermoplastic polymers or copolymers.

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3. The composition of claim 1 wherein said matrix polymer, copolymer, or mixture thereof comprises an ethylene vinyl acetate copolymer in an amount not less than 5 parts and not greater than 100 parts, based on 100 parts of said component (A).

4. The composition of claim 1 wherein said matrix polymer, copolymer, or mixture thereof comprises polyethylene, polypropylene, or blend thereof.

5. The composition of claim 4 wherein said matrix polymer, copolymer, or mixture thereof comprises a copolymer of polyethylene and polypropylene.

6. The composition of claim 1 wherein said organopolysiloxane is poly(dimethyl) siloxane.

7. The composition of claim 1 wherein said saturated amide is selected from the group consisting of behenamide, stearamide, arachidamide, palmitamide, myristamide, lauramide and ethylene bis-stearamide.

8. The composition of claim 7 wherein said saturated amide is stearamide.

9. The composition of claim 7 wherein said saturated amide is behenamide.

10. The composition of claim 1 being molded into a beverage container.

11. The composition of claim 1 being molded into a beverage container closure.

12. The composition of claim 11 wherein said beverage container closure is a plastic cap.

13. The composition of claim 1 being molded into a cap liner.

14. The composition of claim 1 wherein said matrix polymer comprises ethylene vinyl acetate copolymer, and further comprises poly(ethylene propylene copolymer).

15. The composition of claim 1 wherein said ethylene vinyl acetate copolymer or terpolymer and said poly(ethylene propylene) copolymer constitute 100% of said matrix polymer.

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16. The composition of claim 14 wherein said saturated amide is stearamide.
17. The composition of claim 16 wherein said organopolysiloxane is poly(dimethyl)siloxane.
18. The composition of claim 1 wherein said matrix polymer comprises poly(vinyl chloride) polymer.
19. The composition of claim 18 wherein said poly(vinyl chloride) polymer constitutes 100% of said matrix polymer.
20. The composition of claim 1 wherein said matrix polymer comprises polyethylene, polypropylene, or mixture thereof; and said matrix polymer further comprises styrene ethylene butylene styrene block copolymer.